

What is Claimed is:

1. A purified and isolated nucleic acid encoding sodium/iodide symporter.

2. The nucleic acid of Claim 1, which is
5 genomic DNA, cDNA, mRNA or antisense RNA.

3. The nucleic acid of Claim 1 contained in the vector deposited under ATCC Accession No. _____.

4. A vector comprising nucleic acid encoding sodium/iodide symporter.

10 5. The vector of Claim 4, wherein said nucleic acid is contained in the vector deposited under ATCC Accession No. _____.

6. A host cell transformed by a vector comprising nucleic acid encoding sodium/iodide symporter.

15 7. The host cell of Claim 6, wherein said nucleic acid is contained in the vector deposited under ATCC Accession No. _____.

8. The host cell of Claim 6 which is a prokaryotic cell.

20 9. The host cell of Claim 6 which is a eukaryotic cell.

10. A method for producing recombinant sodium/iodide symporter comprising growing a host cell transformed with a vector comprising nucleic acid encoding
25 sodium/iodide symporter in culture and recovering sodium/iodide symporter from said culture.

11. The method of Claim 10, wherein said nucleic acid is contained in the vector deposited under ATCC Accession No. _____.

30 12. The method of Claim 10, wherein said host cell is a prokaryotic cell.

13. The method of Claim 10, wherein said host cell is a eukaryotic cell.

35 14. A purified sodium/iodide symporter or an analogue thereof.

15. The purified sodium/iodide symporter of Claim 14 which is recombinantly produced.

17. A nucleic acid probe which hybridizes to nucleic acid encoding sodium/iodide symporter.

19. The probe of Claim 17, wherein said nucleic acid is DNA or RNA.

21. The mixture of nucleic acid probes of Claim 20, which are labeled with a detectable marker.

23. A kit comprising one or more nucleic acid probes which hybridize to nucleic acid encoding sodium/iodide symporter.

25. The antibody of Claim 24 which is polyclonal.

27. The antibody of Claim 24 which is labeled with a detectable marker.

29. A method for diagnosing a thyroid disorder in a subject comprising detecting one or more mutations in nucleic acid encoding sodium/iodide symporter in said subject.

30. The method of Claim 29, wherein said mutations are detected by hybridization analysis using one or more nucleic acid probes prepared from nucleic acid encoding sodium/iodide symporter.

31. A method for diagnosing a thyroid disorder in a subject comprising detecting a mutated sodium/iodide symporter in said subject.

32. The method of Claim 31, wherein said
5 mutated sodium/iodide symporter is detected by an antibody immunoreactive with said mutated sodium/iodide symporter.

33. A method for diagnosing a thyroid disorder in a subject comprising detecting a decreased concentration of sodium/iodide symporter from said subject
10 relative to normal physiological levels of said sodium/iodide symporter.

34. The method of Claim 33, wherein said decreased concentration of sodium/iodide symporter is detected by an antibody immunoreactive with said
15 sodium/iodide symporter.

35. The method of Claim 33, wherein said decreased concentration of sodium/iodide symporter is detected by hybridization analysis using one or more nucleic acid probes prepared from nucleic acid encoding
20 sodium/iodide symporter.

36. A method for treating a thyroid disorder caused by a mutated nucleic acid encoding sodium/iodide symporter comprising introducing nucleic acid encoding sodium/iodide symporter into substantially all of said
25 thyroid cells of said subject such that an amount of said sodium/iodide symporter effective to treat said thyroid disorder is expressed in said thyroid cells.

37. The method of Claim 36, wherein said nucleic acid is introduced by a viral vector.

30 38. The method of Claim 37, wherein said viral vector is a DNA virus.

39. The method of Claim 37, wherein said viral vector is an RNA virus.

40. The method of Claim 37 wherein said viral
35 vector is a replication-defective retrovirus.

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41. The method of Claim 36, wherein said thyroid disorder includes hypothyroidism, hyperthyroidism, thyroid cancer or congenital lack of an iodide transport system.

5 42. A recombinant viral vector capable of introducing nucleic acid encoding sodium/iodide symporter into a target cell such that said target cell expresses said sodium/iodide symporter, said vector comprising (a) nucleic acid of or corresponding to at least a portion of
10 the genome of a virus, said portion being capable of infecting said target cell, and (b) nucleic acid encoding a sodium/iodide symporter operably linked to said viral nucleic acid.

43. The recombinant viral vector of Claim 42
15 which is a replication-defective retrovirus.

44. A method for selectively ablating a target tissue in a subject comprising: (a) introducing nucleic acid encoding sodium/iodide symporter into substantially all cells of said target tissue such that said cells
20 exhibit sodium/iodide symport activity; and (b) supplying radioactive iodide to said cells of said target tissue in an amount sufficient to ablate said target tissue upon uptake of said radioactive iodide by said cells.

45. The method of Claim 44, wherein said target
25 tissue is thyroid or non-thyroid tissue.

46. The method of Claim 44, wherein said target tissue is a tumor.

47. The method of Claim 44, wherein said target tissue is a thyroid tumor.

30 48. The method of Claim 44, wherein said nucleic acid is introduced in a viral vector.

49. The method of Claim 48, wherein said viral vector is a DNA virus.

50. The method of Claim 48, wherein said viral
35 vector is an RNA virus.

51. The method of Claim 48, wherein said viral vector is a replication-defective retrovirus.

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52. A method for identifying an iodide transport protein from non-thyroid tissue comprising contacting nucleic acid from said non-thyroid tissue with a nucleic acid probe made from nucleic acid encoding sodium/iodide symporter and detecting hybridization thereof.

53. The method of Claim 52, wherein said non-thyroid tissue includes salivary gland, gastric mucosa, lactating mammary gland, choroid plexus, and ciliary body of the eye.

54. The method of Claim 52, wherein said probe is labeled with a detectable marker.

55. A non-human, transgenic animal model for a thyroid disorder comprising mutated nucleic acid encoding sodium/iodide symporter incorporated into thyroid cells of said animal.